

WHAT IS CLAIMED IS:

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1. A circuit for converting packets into an optical path signal, wherein said circuit is used in a transmission device for transmitting packets, said circuit comprising:

10 means for converting the packets into a plurality of data streams;

means for multiplexing the data streams;

and

15 means for generating said optical path signal by adding at least one overhead to the multiplexed data streams.

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2. The circuit as claimed in claim 1, wherein said packets are IP packets which are used for realizing a communication by the Internet Protocol.

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3. A circuit for converting packets into an optical path signal which is used for wavelength division multiplexing (WDM) transmission, wherein said circuit is used in a transmission device for transmitting packets, said circuit comprising:

30 means for converting the packets into a plurality of data streams by using at least one data link layer process;

means for multiplexing the data streams by

using at least one interleaving process and for generating data which is a unit of said wavelength division multiplexing (WDM) transmission; and

5 means for generating said optical path signal by adding at least one overhead which is necessary for said wavelength division multiplexing (WDM) transmission to the data.

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4. A circuit for converting an optical path signal into packets, wherein said circuit is used in a transmission device for transmitting  
15 packets, said circuit comprising:

means for separating at least one overhead from said optical path signal;

20 means for generating data streams by demultiplexing data of said optical path signal without the overhead; and

means for extracting the packets from the data streams.

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5. The circuit as claimed in claim 4, wherein said packets are IP packets which are used for realizing a communication by the Internet  
30 Protocol.

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6. A circuit for converting an optical path signal which is used for wavelength division multiplexing (WDM) transmission into packets,

wherein said circuit is used in a transmission device for transmitting packets, said circuit comprising:

- means for separating at least one overhead
- 5 which is necessary for said wavelength division multiplexing (WDM) transmission from said optical path signal;
- means for generating data streams by demultiplexing data of said optical path signal
- 10 without the overhead; and
- means for extracting the packets from the data streams by using at least one data link layer process.

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7. A transmission device for transmitting packets, said transmission device comprising:

- 20 means for converting the packets into a optical path signal and for sending the optical path signal by using wavelength division multiplexing (WDM); and
- means for converting the optical path
- 25 signal which is received into the packets.

- 30 8. The transmission device as claimed in claim 7, wherein said packets are IP packets which are used for realizing a communication by the Internet Protocol.

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9. A transmission device for transmitting packets, said transmission device comprising:

5 a first circuit comprising means for converting the packets into a plurality of data streams, means for multiplexing the data streams, means for generating an optical path signal by adding at least one overhead to the multiplexed data streams and means for sending the optical path signal by using wavelength division multiplexing  
10 (WDM); and

a second circuit comprising means for separating at least one overhead from said optical path signal, means for generating data streams by demultiplexing data of said optical path signal  
15 without the overhead and means for extracting the packets from the data streams.

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10. A transmission device for transmitting packets by converting the packets into an optical path signal, said transmission device comprising:

25 packet mapping means for mapping a plurality of packets into an entire payload area of the optical path signal; and

packet retrieving means for extracting said each packet from the payload area.

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11. The transmission device as claimed in claim 10, wherein said packets are IP packets which  
35 are used for realizing a communication by the Internet Protocol.

12. A transmission system for transmitting  
5 packets, said transmission system comprising:  
a plurality of transmission devices each  
of which comprises means for converting the packets  
into an optical path signal and for sending the  
optical path signal by using wavelength division  
10 multiplexing (WDM), and means for converting the  
optical path signal into the packets; and  
means for establishing a connection  
between said transmission devices by using the  
optical path signal.

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13. The transmission system as claimed in  
20 claim 12, wherein said packets are IP packets which  
are used for realizing a communication by the  
Internet Protocol.

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14. A transmission system for  
transmitting packets by using wavelength division  
multiplexing (WDM), said transmission system  
30 comprising:  
a plurality of transmission devices each  
of which comprises: a first circuit including means  
for converting the packets into a plurality of data  
streams, means for multiplexing the data streams,  
35 means for generating an optical path signal by  
adding at least one overhead to the multiplexed data  
streams and means for sending the optical path

signal by using wavelength division multiplexing (WDM); and a second circuit comprising means for separating at least one overhead from said optical path signal, means for generating data streams by  
5 demultiplexing data of said optical path signal without the overhead and means for extracting the packets from the data streams; and  
means for establishing a connection  
between said transmission devices by using the  
10 optical path signal.

15 15. A transmission system for transmitting packets, said transmission system comprising:  
a plurality of transmission devices each  
of which comprises packet mapping means for mapping  
a plurality of packets into an entire payload area  
20 of an optical path signal and packet retrieving means for extracting said each packet from the payload area; and  
means for establishing a connection  
between said transmission devices by using the  
25 optical path signal.

30 16. The transmission system as claimed in claim 15, wherein said packets are IP packets which are used for realizing a communication by the Internet Protocol.

17. A method for converting packets into an optical path signal which is used for wavelength division multiplexing (WDM) transmission, wherein said method is used in a transmission device for  
5 transmitting packets, said method comprising the steps of:

converting the packets into a plurality of data streams by using at least one data link layer process;

10 multiplexing the data streams by using at least one interleaving process and generating data which is a unit of said wavelength division multiplexing (WDM) transmission; and

generating said optical path signal by  
15 adding at least one overhead which is necessary for said wavelength division multiplexing (WDM) transmission to the data.

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18. A method for converting an optical path signal which is used for wavelength division multiplexing (WDM) transmission into packets,  
25 wherein said method is used in a transmission device for transmitting packets, said method comprising the steps of:

separating at least one overhead which is necessary for said wavelength division multiplexing  
30 (WDM) transmission from said optical path signal;

generating data streams by demultiplexing data of said optical path signal without the overhead; and

extracting the packets from the data  
35 streams by using at least one data link layer process.

19. A circuit for converting packets into  
5 a signal which is a transmission unit in a  
synchronous digital transmission standard, wherein  
said circuit is used in a transmission device for  
transmitting packets, said circuit comprising:  
means for converting the packets into a  
10 plurality of data streams;  
means for multiplexing the data streams  
without adding any overhead for upper layer  
transmission; and  
means for generating said signal by adding  
15 at least one overhead to the multiplexed data  
streams.

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20. The circuit as claimed in claim 19,  
wherein said packets are IP packets which are used  
for realizing a communication by the Internet  
Protocol.

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21. A circuit for converting packets into  
30 an STM signal in SDH transmission, wherein said  
circuit is used in a transmission device for  
transmitting packets, said circuit comprising:  
means for converting the packets into a  
plurality of data streams by using at least one data  
35 link layer process;  
means for multiplexing the data streams by  
using at least one interleaving process without



adding any overhead of a VC signal and for  
generating STM data which is a unit of said SDH  
transmission; and

means for generating said STM signal by  
5 adding at least one overhead which is necessary for  
said SDH transmission to the STM data.

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22. A circuit for converting a signal  
which is a transmission unit in a synchronous  
digital transmission standard into packets, wherein  
said circuit is used in a transmission device for  
15 transmitting packets, said circuit comprising:

means for separating at least one overhead  
from said signal;

means for generating data streams by  
demultiplexing data of said signal without the  
20 overhead; and

means for extracting the packets from the  
data streams.

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23. The circuit as claimed in claim 22,  
wherein said packets are IP packets which are used  
for realizing a communication by the Internet  
30 Protocol.

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24. A circuit for converting an STM  
signal in SDH transmission into packets, wherein  
said circuit is used in a transmission device for

transmitting packets, said circuit comprising:

means for separating at least one overhead which is necessary for said SDH transmission from said STM signal;

5 means for generating data streams by demultiplexing data of said STM signal without the overhead; and

means for extracting the packets from the data streams by using at least one data link layer  
10 process.

15 25. A transmission device for transmitting packets, said transmission device comprising:

means for converting the packets into a signal which is a transmission unit in a synchronous digital transmission standard and for sending the  
20 signal by said synchronous digital transmission; and

means for converting said signal into the packets.

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26. The transmission device as claimed in claim 25, wherein said packets are IP packets which are used for realizing a communication by the  
30 Internet Protocol.

35 27. A transmission device for transmitting packets by using a transmission unit in a synchronous digital transmission standard, said

transmission device comprising:

5 a first circuit comprising means for  
converting the packets into a plurality of data  
streams, means for multiplexing the data streams  
without adding any overhead for upper layer  
transmission, means for generating a signal which is  
the transmission unit by adding at least one  
overhead to the multiplexed data streams and means  
for sending the signal by said synchronous digital  
10 transmission; and

a second circuit comprising means for  
separating at least one overhead from said signal,  
means for generating data streams by demultiplexing  
data of said signal without the overhead and means  
15 for extracting the packets from the data streams.

20 28. A transmission device for  
transmitting packets by converting the packets into  
an STM signal, said transmission device comprising:

packet mapping means for mapping a  
plurality of packets into an entire section payload  
25 area of the STM signal; and

packet retrieving means for extracting  
said each packet from the section payload area.

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29. The transmission device as claimed in  
claim 28, wherein said packets are IP packets which  
are used for realizing a communication by the  
35 Internet Protocol.

30. A transmission system for  
transmitting packets, said transmission system  
5 comprising:

a plurality of transmission devices each  
of which comprises means for converting the packets  
into a signal which is a transmission unit in a  
synchronous digital transmission standard, means for  
10 sending the signal by said synchronous digital  
transmission and means for converting said signal  
into the packets; and

means for establishing a connection  
between said transmission devices by using said  
15 signal.

20 31. The transmission system as claimed in  
claim 30, wherein said packets are IP packets which  
are used for realizing a communication by the  
Internet Protocol.

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32. A transmission system for  
transmitting packets by using a transmission unit in  
30 a synchronous digital transmission standard, said  
transmission system comprising:

a plurality of transmission devices each  
of which comprises: a first circuit including means  
for converting the packets into a plurality of data  
35 streams, means for multiplexing the data streams  
without adding any overhead for upper layer  
transmission, means for generating a signal which is

the transmission unit by adding at least one overhead to the multiplexed data streams and means for sending the signal by said synchronous digital transmission; and a second circuit including means  
5 for separating at least one overhead from said signal, means for generating data streams by demultiplexing data of said signal without the overhead and means for extracting the packets from the data streams; and  
10 means for establishing a connection between said transmission devices by using said signal.

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33. A transmission system for transmitting packets, said transmission system comprising:  
20 a plurality of transmission devices each of which comprises packet mapping means for mapping a plurality of packets into an entire section payload area of an STM signal and packet retrieving means for extracting said each packet from the  
25 section payload area; and  
means for establishing a connection between said transmission devices by using said STM signal.

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34. The transmission system as claimed in claim 33, wherein said packets are IP packets which  
35 are used for realizing a communication by the Internet Protocol.

35. A method for converting packets into  
5 an STM signal in SDH transmission, wherein said  
method is used in a transmission device for  
transmitting packets, said method comprising the  
steps of:

converting the packets into a plurality of  
10 data streams by using at least one data link layer  
process;

multiplexing the data streams by using at  
least one interleaving process without adding any  
overhead of a VC signal and generating STM data  
15 which is a unit of said SDH transmission; and

generating said STM signal by adding at  
least one overhead which is necessary for said SDH  
transmission to the STM data.

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36. A method for converting an STM signal  
in SDH transmission into packets, wherein said  
25 method is used in a transmission device for  
transmitting packets, said method comprising the  
steps of:

separating at least one overhead which is  
necessary for said SDH transmission from said STM  
30 signal;

generating data streams by demultiplexing  
data of said STM signal without the overhead; and

extracting the packets from the data  
streams by using at least one data link layer  
35 process.